Designing a cellular niche for transplantation of human embryonic stem cell-derived beta cells

Grant Award Details

Designing a cellular niche for transplantation of human embryonic stem cell-derived beta cells

Grant Type: Quest - Discovery Stage Research Projects

Grant Number: DISC2-09635

Project Objective: The expected outcome of these studies is a cellular therapeutic for Type I Diabetes: engineered human islets for transplant into patients, surpassing the function of beta cells or progenitors alone.

Investigator:

Name:	Julie Sneddon
Institution:	University of California, San Francisco
Type:	PI

Disease Focus: Diabetes, Metabolic Disorders

Human Stem Cell Use: Embryonic Stem Cell

Award Value: $2,006,076

Status: Active

Grant Application Details

Application Title: Designing a cellular niche for transplantation of human embryonic stem cell-derived beta cells

Public Abstract:

Research Objective

The expected outcome of these studies is a cellular therapeutic for Type I Diabetes: engineered human islets for transplant
into patients, surpassing the function of beta cells or progenitors alone.

Impact

The proposed studies would address key bottlenecks in cell replacement therapy for Type I Diabetes -- issues with cellular engraftment, survival, and function -- enabling optimized delivery in vivo.

Major Proposed Activities

- Determine the optimal composition of human embryonic stem cell (hESC)-derived engineered islets in vitro.
- Define key pathways underlying the mechanisms of niche-induced maturation of hESC-derived beta-like cells.
- Demonstrate function of engineered islets in vivo in immunodeficient animal models of type I diabetes.

Statement of Benefit to California:

Type I Diabetes (T1D) is a significant burden in California, especially for children; according to estimates provided by the
California Diabetes Program, ~2.3 out of every 1,000 children between the ages of 5-19 in California had diagnosed diabetes
in 2008, with 83% having T1D. Research proposed here would represent a significant step towards the holy grail of T1D
treatment: a therapy for patients without the need for the administration of insulin, frequent blood testing, or
immunosuppression.
